

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC

WC Docket No. 17-108  
GN Docket No. 14-28

In the Matter of

Restoring Internet Freedom

Protecting and Promoting the Open Internet

Fallacies Behind Reclassifying Broadband Internet  
Access Service as an Information Service

Jon M. Peha

Professor, Carnegie Mellon University

Address: Carnegie Mellon University  
Department of EPP  
Pittsburgh, PA 15213-3890  
[peha@cmu.edu](mailto:peha@cmu.edu)  
[www.ece.cmu.edu/~peha](http://www.ece.cmu.edu/~peha)

July 17, 2017

## Author Qualifications

Jon Peha is a Full Professor at Carnegie Mellon University, with experience in industry, government, and academia. In government, he served at the FCC as Chief Technologist, in the White House as Assistant Director of OSTP, in the House Energy & Commerce Committee, and at USAID for the Telecommunications Leadership Program. In industry, he has been Chief Technical Officer for three high-tech companies, and member of technical staff at SRI International, AT&T Bell Labs, and Microsoft. At Carnegie Mellon, he is a Professor in the Dept. of Electrical & Computer Engineering and the Dept. of Engineering & Public Policy, and former Associate Director of the Center for Wireless & Broadband Networking. Dr. Peha holds a PhD in electrical engineering from Stanford. He is an *IEEE Fellow* and an *AAAS Fellow*, and was selected by AAAS as one of 40 Featured Science and Technology Policy Fellows of the last 40 years ("40@40"). Dr. Peha has received the FCC's "Excellence in Engineering Award," the IEEE Communications Society TCCN Publication Award for career contributions to spectrum management, and the Brown Engineering Medal. He consults on a wide range of technical and policy issues related to information and communications technology.

## Disclaimer

In writing this comment, Dr. Peha represents no one but himself.

## Executive Summary

The Federal Communications Commission (FCC) is required by law to classify commercial broadband Internet access service (BIAS) as offered in the U.S. today as a telecommunications service, which is regulated under Title II of the Communications Act. Congress defined “telecommunications service,” and the FCC does not have authority to alter or ignore the definition established by law. The core of today’s Internet access service is *IP Packet Transfer*, which transfers information without change of form or content. IP Packet Transfer fits the legal definition of telecommunications service, and does not fit the legal definition of information service [CP14, PE15], as the FCC found in 2015 [FC15]. This paper shows that the assertions to the contrary in the latest FCC Notice of Proposed Rulemaking (NPRM) [FC17] are incorrect, often based on an incorrect representation of the technology. To conclude that BIAS providers are information service providers, the FCC consistently gives BIAS providers credit for services offered by others. Using FCC logic, I could call 5<sup>th</sup> Avenue a “food provider,” because I drive over 5<sup>th</sup> Avenue on my way to the grocery store. Moreover, most of the assertions in the NPRM made to argue that a BIAS is an information service are at least as applicable to today’s telephone network, much of which is now IP-based. Thus, an FCC decision in 2017 that a BIAS is an information service while a telephone service is a telecommunications service would be a textbook example of being arbitrary and capricious.

Beyond simply applying the legal definitions, there have been two common arguments in favor of changing the classification of commercial BIAS services from telecommunications service to information service, both of which are baseless. One such argument is that the FCC should not classify BIAS as telecommunications because this would impose onerous “utility” regulations that are contrary to the public interest. This argument is ludicrous for two reasons. First, this argument contradicts the law. Congress foresaw that strict regulation would not always be the answer, and granted the FCC significant flexibility to regulate as appropriate or to forbear entirely from imposing many regulations that are authorized under Title II. Thus, classification as a telecommunications service does not require onerous regulations. I have argued for many years [PE06] and in the current proceedings [PE17] that the public interest is best served by light network neutrality regulations, which prevent Internet service providers (ISPs) from becoming information gatekeepers while still giving them flexibility to provide valuable services and to innovate. Such a policy is compatible with classification as a telecommunications service when combined with forbearance where appropriate. (So far at least, the courts have not found an effective light-touch policy to be compatible with classification as an information service.) Second, regardless of what the FCC might think about whether applying Title II is in the public interest, the FCC is still required to follow the law, and the law is clear; Title II applies.

The other baseless argument is that the FCC and the courts have already decided that BIAS is an information service in the past, and the FCC in 2017 must conform to decisions of the distant past, while strangely ignoring the FCC’s decision of 2015. Internet technology and Internet services have changed dramatically since the 1996 Telecommunications Act was passed. Consequently, the FCC must consider how to classify Internet access as it is offered today, not as it was offered in years past. To the extent that the FCC does consider past decisions, more recent evaluations are more likely to be relevant to today, and the most recent evaluation found that a BIAS is a telecommunications service. If others adopt the eccentric approach to precedent proposed in this NPRM, then the State of Michigan might conclude in perpetuity that drinking water in the City of Flint should be classified as “safe” based on the findings of a 1990s study, even if those findings are contradicted by all recent analyses.

## Response to NPRM

It was established in a submission to the FCC by Cherry & Peha [CP14] (and by Peha [PE15]) that a commercial broadband Internet access service is a telecommunications service, and that the FCC lacks authority to disregard this. For a basic understanding of why a commercial BIAS is a telecommunications service, see the appendix for an excerpt from these prior works. The remainder of this section responds point by point to the NPRM's assertions to the contrary, which are contained in Section III of the NRPM [FC17].

### Paragraph 27 of NPRM:

We believe that Internet service providers offer the “capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications.” Whether posting on social media or drafting a blog, a broadband Internet user is able to generate and make available information online. Whether reading a newspaper's website or browsing the results from a search engine, a broadband Internet user is able to acquire and retrieve information online. Whether it's an address book or a grocery list, a broadband Internet user is able to store and utilize information online. Whether uploading filtered photographs or translating text into a foreign language, a broadband Internet user is able to transform and process information online. In short, broadband Internet access service appears to offer its users the “capability” to perform each and every one of the functions listed in the definition—and accordingly appears to be an information service by definition. We seek comment on this analysis.

### Response

**The FCC's analysis is wrong. Mere Internet access does not provide any of the functions listed above. The “capability” to perform functions associated with an information service are offered by content providers and application service providers, and in most cases Internet users do not get these capabilities from Internet service providers. Consider the case of a consumer “reading a newspaper's website” using a residential broadband Internet access service. The reader typically uses a computer in her home, which was not provided by her ISP and is not operated by her ISP. The consumer's computer exchanges information in the form of IP packets with another computer that is operated by the newspaper (or perhaps a hosting service acting as a paid agent of the newspaper). It is the computer belonging to the newspaper or its agent that stores news articles, retrieves news articles upon demand, and make news articles available, so the newspaper's service meets the definition of information service. All the Internet service provider does in this case is to provide an IP Packet Transfer service as defined in the appendix and elsewhere [CP14, PE15], i.e. the ISP moves packets from sender to recipient without any change in form or content. This meets the definition of telecommunications. Similarly, when the consumer is posting on social media, drafting a blog, browsing the results of a search, or uploading photos, the computers owned by the subscriber and by the content and application service providers are involved with “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications,” while the ISP simply provides telecommunications in the form of IP Packet Transfer.**

Moreover, if the FCC concludes using the (weak) logic above that Internet access is an information service, then the FCC must also conclude that basic telephone service is also an information service. Newspapers did not always have websites. Like many Americans, when I wanted the latest sports scores back then, I sometimes made a telephone call to listen to a prerecorded message provided by a news organization. The telephone company was transferring information between me and a system holding the prerecorded message without any change in form or content, exactly as ISPs do today when I access a news website from my computer. Indeed, even when prerecorded messages were not available, I sometimes called my father for sports scores. By the FCC's (weak) logic, when a telephone company made it possible for me to listen to either a prerecorded message or to my own father, the telephone company was making information available, thereby meeting the definition of information service provider. If the FCC adopts this argument that an ISP is an information service, then the FCC must also conclude that the telephone network is and always has been an information service, obviously contradicting what Congress intended.

Paragraph 28 of NPRM:

In the *Cable Modem Order*, the Commission recognized that broadband Internet users often used services from third parties: “[S]ubscribers, by ‘click-through’ access, may obtain many functions from companies with whom the cable operator has not even a contractual relationship. For example, a subscriber to Comcast’s cable modem service may bypass that company’s web browser, proprietary content, and email. The subscriber is free to download and use instead, for example, a web browser from Netscape, content from Fox News, and e-mail in the form of Microsoft’s ‘Hotmail.’” It nonetheless found the classification appropriate “regardless of whether subscribers use all of the functions provided as part of the service, such as e-mail or web-hosting, and regardless of whether every cable modem service provider offers each function that could be included in the service.” In the *Title II Order*, the Commission in turn found that “consumers are very likely to use their high-speed Internet connections to take advantage of competing services offered by third parties” and asserted the service “is useful to consumers today primarily as a conduit for reaching modular content, applications, and services that are provided by unaffiliated third parties.” We seek comment on how consumers are using broadband Internet access service today. ... More generally, we seek comment on the relevance of this analysis.

Response

**It is not relevant which services were offered or used decades ago. It is the Internet services and technology of 2017 that matter. The fundamental service offered by broadband Internet access service providers in 2017 is IP Packet Transfer, which is telecommunications. It is hard to imagine a paying subscriber to a broadband Internet access server who does not use IP Packet Transfer. ISPs market their services primarily by bragging about the quality of the IP packet transfer, e.g. the data rates it can provide, rather than the quality of information services such as proprietary content or email. They do this because that is what Internet customers care about in 2017. It would be difficult to find consumers who view their ISP as their primary provider of information services, or who view information services as the most important thing their ISP offers. That was not always the case. America Online (AOL), for**

**example, once provided extensive information services. Some subscribers chose AOL over rivals because of those information services. Some may even have considered their ISP to be their primary online information service provider. However, the ISP must look at the services as they are offered in 2017 when determining classification.**

Paragraph 28 of NPRM:

The definition of “information service” speaks to the “capability” to perform certain functions. Is a consumer capable of accessing these online services without Internet access service? Could a consumer access these online services using traditional telecommunications services like telephone service or point-to-point special access? Or are we correct that offering Internet access is precisely what makes the service capable of “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information” to consumers?

Response

**The FCC is not correct in asserting that Internet access is what makes an information service capable of “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information” to consumers. Although Internet access is usually the most convenient and cost-effective telecommunications service available for this purpose, there are other telecommunications services that could work. For example, a content provider could make its content available over phone lines instead of the Internet by setting up a phone bank, using technology somewhat similar to that of dial-up Internet access providers. Computers at the content provider and at the end user’s premises would still be responsible for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information” while the telephone network transfers information without change of form or content, just as ISPs transfer information without change of form or content today.**

Paragraph 29 of NPRM:

In contrast, Internet service providers do not appear to offer “telecommunications,” i.e., “the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received,” to their users. *For one*, broadband Internet users do not typically specify the “points” between and among which information is sent online.

Response

**The FCC’s assertion above is not correct. Information typically flows from a device that belongs to and acts on behalf of the subscriber (such as a computer, or a customer premises router, or a smart phone) to a device belonging to the ISP (such as a router) in the form of IP packets. Each packet includes the IP address of the intended recipient, placed there by a device acting on behalf of the user. Thus, the broadband user always specifies the recipient in an IP Packet Transfer service, which constitutes the core of a broadband Internet access service.**

Paragraph 29 of NPRM:

Instead, routing decisions are based on the architecture of the network, not on consumers' instructions, and consumers are often unaware of where online content is stored.

Response

**The FCC's assertion is irrelevant. It is true that consumers do not specify the routes taken by their packets, i.e. the entire series of links over which a packet will travel, but there is nothing about routing in the definition of telecommunications. As any standard text book on Internet technology would show, routing and specifying the end point of communications are entirely different functions, just as there is a difference between specifying the recipient of a mailed letter by writing on the front of the envelope, and specifying the route that the post office truck must travel to deliver that letter.**

**Moreover, if the FCC accepts this (weak) argument that Internet access cannot be telecommunications because end users do not specify route, then the FCC must also conclude that telephone service is not telecommunications. In a telephone network, users specify the phone number they wish to call, which plays the same role as IP address in a BIAS, but users never specify the route that the call should take, i.e. which specific wires should carry the information. While it is true that Internet users who specify an IP address do not know where on a map the device associated with that IP address may be located, the same is true for telephone users who call a telephone. This is especially true when the telephone number has been assigned to a cell phone, which could be anywhere in the world.**

Paragraph 29 of NPRM:

Domain names must be translated into IP addresses (and there is no one-to-one correspondence between the two).

Response

**The FCC's assertion is irrelevant. Domain name translations are not relevant to this issue. Customers always send IP packets to their Internet access service provider with an IP address that is associated with the intended recipient of that packet. Customers never send IP packets to their Internet access service provider with the domain name as the intended recipient. That is not how Internet technology works.**

**Moreover, if the FCC adopts the (weak) argument that Internet access is not a telecommunications service because of domain name translation, then the FCC must also conclude that telephone service is not a telecommunications service. Domain name lookups on the Internet are very similar to directory (411) lookups on the telephone network. When the end user already knows the IP address or phone number of the recipient, respectively, then no look-up is necessary. When the user does not have this information, then a look-up occurs first, which maps name to phone number in a telephone network, and maps domain name to IP address on the Internet. In the case of the telephone network, the request may be made to the telephone company, or some other provider. Similarly, in the case of the domain name, the request might be sent to the Internet access provider, or it might be sent to some**

**other provider. For example, Google provides this service to users anywhere on the Internet. An Internet access service need not offer domain name look-ups at all, just as a telephone service need not offer 411, although most do.**

Paragraph 29 of NPRM:

Even IP addresses may not specify where information is transmitted to or from because caching servers store and serve popular information to reduce network loads.

Response

**The FCC's assertion is irrelevant. The definition of telecommunications requires information to be sent "between or among points specified by the user." Even when a packet is sent to a cache, the sender of that packet included an IP address that identified which end points the sender desired. A cache can only provide information if the cache has information that is appropriate for the end point as explicitly specified by the sender.**

**Moreover, if the FCC adopts the (weak) argument that Internet access is not telecommunications because an IP address can sometimes be mapped to more than one server, some of which support caches, then the FCC must also conclude that telephone service is not telecommunications, because many calls to 800 numbers can be mapped to any one of a number of call centers around the country, and the initiator of the call does not specify which.**

Paragraph 29 of NPRM:

In short, broadband Internet users are paying for the access to information "with no knowledge of the physical location of the server where that information resides." We believe that consumers want and pay for these functionalities that go beyond mere transmission—and that they have come to expect them as part and parcel of broadband Internet access service. We seek comment on our analysis.

Response:

**The FCC's analysis is incorrect. There is nothing in the definition of telecommunications service that requires an end user to have knowledge of the physical location of the party with whom she is communicating, so this assertion is irrelevant. Moreover, if that were part of the definition, then telephone service would not be telecommunications, because people calling cell phones or 800 numbers have no knowledge of the physical location of the entity they are calling.**

**The primary thing that "consumers want and pay for" is IP Packet Transfer, which meets the definition of telecommunications under the 1996 Telecommunications Act. See appendix for the definition of IP Packet Transfer. Customers also want information services, but they almost always get those information services from entities other than their BIAS provider.**



Paragraph 29 of NPRM:

We particularly seek comment on the *Title II Order*'s assertion that the phrase "points specified by the user" is ambiguous—how should we interpret that phrase so that it carries with it independent meaning and is not mere surplusage? Is it enough, as the *Title II Order* asserted, for a broadband Internet user to specify the information he is trying to access but not the "points" between or among which the information will be transmitted? Does it matter that the Internet service provider specifies the points between and among which information will be transmitted?

Response:

**The phrase "points specified by the user" is reasonably clear, and the FCC's assertion that "the Internet service provider specifies the points between and among which information will be transmitted" is incorrect. An Internet user specifies the point with which it is communicating by specifying the destination IP address in each packet. The destination IP address identifies where the sender would like a packet to be sent. A cell phone number could serve the same purpose in a cellular phone service. The BIAS provider does not specify the destination IP address for its users' packets, so the FCC's assertion is wrong.**

**The phrase adds clarity to the definition because it is untrue for some services that are not considered telecommunications. For example, with over-the-air broadcast television, the sender does not identify intended recipients or limit recipients in any way, so including this phrase in the definition implies that over-the-air broadcast television is not telecommunications. Thus, this portion of the definition "is not mere surplusage."**

Paragraph 30 of NPRM:

Internet service providers routinely change the form or content of the information sent over their networks—for example, by using firewalls to block harmful content or using protocol processing to interweave IPv4 networks with IPv6 networks. The Commission has acknowledged that broadband Internet networks must be reasonably managed since at least the *2005 Internet Policy Statement*. We believe that consumers want and pay for these functionalities that go beyond mere transmission—and that they have come to expect them as part and parcel of broadband Internet access service. We seek comment on our analysis.

Response:

**The FCC's analysis is incorrect. Internet service providers do not "routinely change the form or content of the information sent over their networks."**

**When a firewall blocks traffic that is believed to be harmful, the firewall does not change the form or content of any packet. It simply allows some packets through and not others. Similarly, the post office may occasionally have a package destroyed because the package appears to be dangerous, or the post office may simply lose a package by mistake. That does not mean that the post office changes the form or content of the packages it delivers, as one would be forced to conclude under the FCC logic.**

Under some widely-used technical approaches, when a network carries both IPv4 packets and IPv6 packets, it is still true that an IPv4 packet travels from sender to recipient, and an IPv6 packet travels from sender to recipient, all without change of format or content. However, it is technically possible to use a form of translation between IPv4 and IPv6. I cannot speak to how widely this technique is actually used by BIAS providers in 2017, but if it is used at all, it would affect only a small fraction of Internet traffic carried by BIAS providers. In this case, the content bits of a packet are sent without any change in form or content, but there is a change in the format of the packet as a whole. If this translation is occurring, it is best viewed as incidental, in part because telephone systems have been doing far more complex translations than this, and this has not led the FCC to question their classification as telecommunications. Telephone networks support end devices that send and receive information in very different formats. Some use analog circuits. Some use digital circuits. Some use IP packets, just like the Internet. Telephone networks routinely use gateways that change the format of information, e.g. from analog circuit to stream of IP packets. It is not plausible that these translations are incidental, but conversion from IPv4 to IPv6 is not incidental. Once again, if the FCC uses this argument to conclude that BIAS is not telecommunications, then the FCC must conclude that telephone service is not telecommunications.

Paragraph 31 of NPRM:

Other provisions of the Act appear to confirm our analysis that broadband Internet access services should be classified as information services. For instance, section 230 defines an interactive computer service to mean “*any information service, system, or access software provider that provides or enables computer access by multiple users to a computer server, including specifically a service or system that provides access to the Internet and such systems operated or services offered by libraries or educational institutions.*” On its face, the plain language of this provision deems Internet access service an information service. We seek comment on this analysis, on the language of section 230, and on how it should impact our classification of broadband Internet access service.

Response:

**The FCC’s analysis is incorrect. The plain language quoted here does not indicate that a broadband Internet access service should be classified as an information service. Section 230 defines an interactive computer service as either (i) “an information service” or (ii) a “system” or (iii) a “computer server” with certain specified qualities, i.e. that it “provides or enables computer access by multiple users to a computer server.” We are told that “a service or system that provides access to the Internet” would be included in one of these three categories. This could mean that “a service or system that provides access to the Internet” is a “system ... that provides or enables computer access by multiple users to a computer server” but is not an information service.**

**Moreover, Section 230 states that the definition of interactive computer service applies “as used in this section,” so it is not clear that it would apply more broadly even if it were actually relevant to the definition of information service, which it is not. Luckily, we do not have to search between the lines of a potentially irrelevant section for a definition of information services that just isn’t there, because**

**Congress explicitly provided a definition in the 1996 Telecommunications Act, and commercial broadband Internet access services are not compatible with that definition.**

Paragraph 32 of NPRM:

Section 231 is even more direct. It expressly states that “Internet access service” “does not include telecommunications services.” And it defines Internet access service as one offering many capabilities (like an information service): “a service that enables users to access content, information, electronic mail, or other services offered over the Internet, and may also include access to proprietary content, information, and other services as part of a package of services offered to consumers.” Although inserted into the Communications Act one year after the Telecommunications Act’s passage and previously interpreted to “clarify that section 231 was not intended to impair our or a state commission’s ability to regulate basic telecommunications services,” this language on its face makes clear that Internet access service is not a telecommunications service. We seek comment on this analysis, on the language of section 231, and on how it should impact our classification of broadband Internet access service.

Response:

**The FCC’s analysis is incorrect. I leave it to others to determine whether the definitions of Section 231 apply more broadly. Regardless, there is nothing in Section 231 that either defines an information service or states that an “Internet access service” is an information service. Indeed, the phrase “information service” does not appear anywhere in Section 231. The definition of “Internet access service” in Section 231 is perfectly compatible with the definition of telecommunications service. According to Section 231, an “Internet access service” “enables users to access” content or services that are “offered over the Internet” by information service providers. An Internet access service provider enables users to do this by allowing users to exchange IP packets with information service providers without changing the form or content of those IP packets. In other words, the Internet access service enables users to do this by providing a telecommunications service.**

Paragraph 33 of NPRM:

The structure of Title II appears to be a poor fit for broadband Internet access service. In the *Title II Order*, the Commission, on its own motion, forbore either in whole or in part on a permanent or temporary basis from 30 separate sections of Title II as well as from other provisions of the Act and Commission rules. The significant forbearance the Commission granted in in the *Title II Order* suggests the highly prescriptive regulatory framework of Title II is unsuited for the dynamic broadband Internet access service marketplace. We seek comment on this analysis, and on what weight we should give this analysis in examining the future of this model of regulation.

Response:

**The FCC’s analysis is incorrect. If anything, the structure of Title II shows the opposite of what the FCC asserts. If the FCC never had the ability to forbear, and it was clear that a “highly prescriptive regulatory framework” was not in the public interest in the eyes of lawmakers,**

then it might be reasonable to conclude that Title II was a poor fit. However, the authors of the Telecommunications Act recognized that imposing certain regulations is sometimes in the public interest and sometimes contrary to the public interest, and they gave the expert agency the flexibility to decide. The fact that the Act gave the FCC flexibility to forbear from these sections is an indication that the FCC's 2015 order is consistent with the structure of the statute, and perhaps even anticipated by lawmakers.

Paragraph 34 of NPRM:

The purposes of the Telecommunications Act appear to be better served by classifying broadband Internet access service as an information service. ... An information service classification would “reduce regulation” and preserve a free market “unfettered by Federal or State regulation”—but a telecommunications service classification would not. We seek comment on this analysis.

Response:

**The FCC asserts that “the purposes of the Telecommunications appear be better served by classifying broadband Internet access service as an information service.” “Appearances” aside, any meaningful analysis to determine whether the “intent” or “purposes of the Telecommunications Act” is actually “better served by classifying broadband Internet access service as an information service” must take into account the fact that the FCC has the authority to forbear from much of Title II. This fact is not reflected in the FCC’s “analysis” in this paragraph of the NPRM.**

**Moreover, if it is ultimately concluded that classifying broadband Internet access service as a telecommunications service is not in the public interest for any reason, then Congress should pass a law that changes the definitions of telecommunications service and information service, or better yet, makes broader changes to the Communications Act to fit not just the Internet of the present but also the Internet of the future. However, until that occurs, the FCC must comply with the existing law, and by that law a commercial broadband Internet access service meets the definition of a telecommunications service.**

Paragraph 36 of NPRM:

We seek special comment on two aspects of the *Title II Order*’s interpretation of the Act. First, the *Title II Order* claimed its interpretation sprang in part from a change in “broadband providers’ marketing and pricing strategies, which emphasize speed and reliability of transmission separately from and over the extra features of the service packages they offer.” It claimed this marketing “leaves a reasonable consumer with the impression that a certain level of transmission capability—measured in terms of ‘speed’ or ‘reliability’—is being offered in exchange for the subscription fee, even if complementary services are also included as part of the offer.” We note that even before the *Cable Modem Order*, the Commission recognized that Internet service providers marketed the speed of their connections. ... More generally, we seek comment on the relevance of this argument.

Response:

**The “speed and reliability of transmission” are characteristics of a telecommunications service. They are not characteristics of an information service. If Internet access providers choose to advertise how good their telecommunications service is, or how their telecommunications service allows access to information provided by third parties, while often not even mentioning any information services (such as e-mail) that they provide, this is consistent with a conclusion that telecommunications is the core offering of these Internet access service providers. Thus, although conclusions should not be drawn based on marketing strategies alone, this argument is relevant, and it supports a conclusion that a BIAS is a telecommunications service.**

Paragraph 37 of NPRM:

Second, the *Title II Order* found that DNS and caching used in broadband Internet access service were just used “for the management, control, or operation of a telecommunications system or the management of a telecommunications service.” The Commission has previously held this category applies to “adjunct-to-basic” functions that are “incidental” to a telecommunications service’s underlying use and “do not alter [its] fundamental character.” As such, these functions generally are not “useful to end users, rather than carriers.” We seek comment on how DNS and caching functions are now used, whether they benefit end users, Internet service providers, or both, and whether they fit within the adjunct-to-basic exception. How would broadband Internet access service work without DNS or caching? Would removing DNS have a merely incidental effect on broadband Internet users, or would it fundamentally change their online experience? Absent caching, would broadband Internet users that now expect high-quality video streaming see only incidental changes or more fundamental changes? Are there other ways that DNS or caching are used for “for the management, control, or operation of a telecommunications system”?

Response:

**The fact that the NPRM would ask whether “removing DNS would have a merely incidental effect on broadband Internet users” demonstrates a misunderstanding about what Internet access providers do, and more importantly, what their customers actually pay for. Removing DNS from the face of the earth, just like shutting down every electric grid on earth, would certainly have an adverse effect on most Internet users, but the relevant question for classification is whether it is important for BIAS providers to offer DNS services or electricity, and the answer is no. Neither providing DNS-related services nor providing electricity are core functions of a broadband Internet access service. The core service today is *IP Packet transfer*, as defined in the Appendix and elsewhere [CP14, PE15].**

**The caching and DNS look-up functions *offered by BIAS providers* do not fundamentally change the online experience, and that supports the FCC’s conclusions in the 2015 Open Internet Order [FC15]. DNS queries are made by the end user, not by the BIAS provider. A BIAS provider could respond to a DNS query, but if broadband Internet access service providers did not offer DNS functions, then end users would simply get this service from other providers. For example, Google offers this service for free. Thus, there would be little impact**

on end users if BIAS providers did not offer DNS services to end users. Indeed, most end users would never know the difference.

Caching can make some types of information retrieval operations appear faster to the end user, and reduce costs for Internet service providers. The end user would observe no other change besides a faster retrieval, so it is safe to say that the presence or absence of caching does not alter the fundamental character of any services. Moreover, as with DNS look-ups, BIAS providers are not the only providers of caching.

#### Section III.A.2 of the NPRM

##### 2 Commission Precedent Supports Classification as an Information Service

Paragraph 38: Our proposed classification of broadband Internet access service as an information service is firmly rooted in Commission precedent. For two decades, a consistent bipartisan framework supported a free and open Internet. That same consensus led to six separate Commission decisions confirming that Internet access service is an information service, subject to Title I. ...

Paragraph 39: We believe the Commission under Democratic and Republican leadership alike was correct in these decisions to classify broadband Internet access service as an information service and that, 20 years after the passage of the Telecommunications Act, we should be reluctant to second-guess the interpretations of those more likely to understand the contemporary meaning of the terms of the Telecommunications Act. We seek comment on our assessment.

#### Response:

**The FCC's assessment in Paragraph 39 is incorrect, as is the FCC's analysis in many other parts of this section for similar reasons. (Since all such claims rely on the same error in logic, I will not address each misstatement individually.)**

**It is true that "a consistent bipartisan framework supported a free and open Internet," but this clearly has not led all to conclude that "that Internet access service is an information service, subject to Title I." It would be more accurate to say that the early assessments found Internet access to be an information service, but that the only recent assessment found Internet access to be a telecommunications service.**

**Technology has changed. Services have changed. It is possible that Internet access twenty years ago would be consistent with one classification and Internet access today would be consistent with a different classification. As such, it would be ridiculous to believe that analysis done many years ago is "more likely to understand the contemporary meaning of the terms of the Telecommunications Act" as applied to current services than the analysis done by the FCC in 2015. Thus, by the logic of Paragraph 39, the Commission "should be reluctant to second-guess the interpretations" of 2015, which means the Commission must conclude that BIAS is a telecommunications service, not an information service. If the Commission does choose to second-guess the most recent analysis, then the Commission should be prepared to**

**base its conclusions on how broadband Internet access services work today, and not in the distant past.**

Section III.A.3 of the NPRM

Paragraph 44: The Commission's decision to reclassify broadband Internet access service as a telecommunications service subject to Title II regulation has resulted in negative consequences for American consumers. ...

Paragraph 45: Following the *2014 Notice* and in the lead up to the *Title II Order*, Internet service providers stated that the increased regulatory burdens of Title II classification would lead to depressed investment. Recent data indicate how accurate those predictions were. ...

Paragraph 46: We believe that these reduced expenditures are a direct and unavoidable result of Title II reclassification, and exercise our predictive judgment that reversing the Title II classification and restoring broadband Internet access service to a Title I service will increase investment. ...

Response

**The FCC's "belief" above is unsupported by evidence, and unsupportable by evidence. It is possible that Open Internet rules could have an effect on American consumers and/or industry expenditures, and it is important to determine whether that effect is positive or negative. However, it is obvious on its face that changing the classification of broadband Internet access service without changing the actual rules cannot have any impact whatsoever on consumers or industry, positive or negative. The FCC has significant latitude to write Open Internet rules if BIAS is regulated under Title I, and even more latitude if BIAS is regulated under Title II. Any results we may have observed that are actually a consequence of the FCC's 2015 Order [FC15] are a result of the specific Open Internet rules adopted, and may not have anything to do with classification. Thus, the entire line of inquiry in Section III.A.3 is built on a false premise, and is likely to yield incorrect results.**

**It is possible to establish Open Internet rules under Title II that are effective and light-touch. Moreover, establishing these rules under Title II reduces the chances that they will not be overturned in court, thereby forcing us to restart this process from the beginning yet again.**

## Appendix: Commercial Internet Access is a Telecommunications Service

This appendix contains excerpts from Peha [PE15] that show that if one applies these statutory definitions, commercial Internet access services as they are offered today are “telecommunications services,” and not “information services.” The FCC repeatedly cited the related comment by Cherry & Peha [CP15] to support its decision to classify a BIAS as a telecommunications service [FC15].

The core offering of an Internet access service today is what I call “IP Packet Transfer,” which is telecommunications, and the commercial offering of IP Packet Transfer is a telecommunications service. Indeed, modern Internet access services fit the definition of telecommunications service established by Congress at least as well as commercial telephone services based on traditional circuit-switched technology—if not better.

### IP Packet Transfer is Telecommunications

We cannot begin to decide what regulations do and do not apply to Internet service providers (ISPs) until we define what they do. The fundamental service of the Internet is the transfer of one or more Internet Protocol (IP) packets from sender to intended recipient, or “IP Packet Transfer,” which is defined below. In that process, a packet may pass through multiple networks, each of which is providing an IP Packet Transfer service of its own.

*A network provides IP Packet Transfer when it transfers IP packets from an ingress point that is receiving IP packets from the sender, to an egress point that can send IP packets to the intended recipient.*

This section will show that IP Packet Transfer fits the statutory definition of “telecommunications” [TA96], which is quoted below:

“The term ‘telecommunications’ means the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.”

It is clear that IP Packet Transfer means transmission of information that is of the packet sender’s choosing, because the sender chooses what information to put in each packet. Moreover, it is the nature of IP Packet Transfer that the “form and content of the information” is precisely the same when an IP packet is sent by the sender as when that same packet is received by the recipient. These are both consistent with the above definition.

The one remaining definitional issue, whether IP Packet Transfer occurs “between or among points specified by the user,” is more complicated. The sender places the IP address of the packet’s intended recipient in each IP packet. In some cases, the sender knows the recipient’s IP address already, and in some cases the sender must first look up the desired IP address. Either way, communications is clearly to a point specified by the user sending the packet. Similarly, in a telephone network, the sender may not know the physical location of the points it specifies, but an IP address (or a telephone number)



completely specifies the endpoint. For that portion of traffic for which the packet's sender and intended recipient are both customers of the same Internet access provider, that is the entire story.

The Internet is a network of networks, however, and this is not always the case. Consider the case where an IP packet travels through several networks before reaching its destination. Collectively, these networks are sending the packet to the point specified by the sender. Individually, each network is sending the packet to an egress point that the network has determined is en route to the point specified by the user. This is essentially the same as long-distance calls in the traditional telephone network, where information travels through a local exchange carrier, then through a long-distance carrier, then finally through another local exchange carrier. Each of these telephone carriers is still said to provide telecommunications. Thus, the same must be said of each ISP that provides IP Packet Transfer.

Note that the analysis above assumed only that a network used IP from ingress to egress. As a result, this analysis is applicable to a wide range of networks, including those designed for cable TV, wireline telephony, or cellular telephony. The Internet is based on a layered design. Underneath the IP layer, there may be a variety of physical infrastructure types, including fiber-optic cable, twisted pair copper, and wireless, as well as a variety of link-layer protocols, including the Data Over Cable Service Interface Specification (DOCSIS)<sup>1</sup> protocol used by many cable TV companies, the Point-to-Point Protocol over Ethernet (PPPoE)<sup>2</sup> protocol used by many telephone companies, and the Long Term Evolution (LTE)<sup>3</sup> protocol used by many cellular companies. On top of the IP layer, there can be a variety of transport protocols, including Transmission Control Protocol (TCP), User Datagram Protocol (UDP), and home-grown proprietary protocols, as well as a variety of applications, including voice over IP (VOIP), web browsing, and video streaming. None of this influences the analysis. In today's Internet, the IP protocol is used to transfer information from an ingress point to an egress point, and IP Packet Transfer meets the legal definition of telecommunications regardless of the layers above or below. This includes when IP Packet Transfer is used for web browsing over a wired network and when it is used for video streaming over a wireless network. Advocates will undoubtedly argue over whether the public interest is best served by network neutrality policies that treat Internet access over wired networks differently from Internet access over wireless networks, but it is clear that both are "telecommunications" under current law.

## A Commercial Internet Access Service *Is* a Telecommunications Service

When Internet access is provided on a commercial basis, this fits the statutory definition of "telecommunications service" [TA96], which is quoted below.

"The term 'telecommunications service' means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used."

---

<sup>1</sup> Data Over Cable Service Interface Specification (DOCSIS) is a protocol that is commonly used to provide broadband Internet access over cable TV networks. In these networks, IP typically runs on top of DOCSIS.

<sup>2</sup> Point-to-Point Protocol over Ethernet (PPPoE) is a protocol that is commonly used to provide Digital Subscriber Loop (DSL) broadband Internet access service over infrastructure that was initially developed for telephone service. In these networks, IP typically runs on top of PPPoE.

<sup>3</sup> Long Term Evolution (LTE) is a 4<sup>th</sup> generation wireless technology that is commonly used to provide broadband Internet access service over cellular networks. In these networks, IP typically runs on top of LTE.

By definition, a commercial Internet access service is offered “for a fee directly to the public, or to such classes of users as to be effectively available directly to the public.” Internet access services vary somewhat from one Internet access provider to another, but the core offering is IP Packet Transfer, which is telecommunications, as shown in Section 2.1. It is IP Packet Transfer that subscribers are seeking when they sign up for an ISP. Other functions of an Internet Access Provider are separable from the core offering, done only in support of the core offering, or both.

A prominent example is electronic mail (“e-mail”). E-mail is an information service. In the wake of the 1996 Telecommunications Act, when the FCC and Supreme Court were making decisions about what constituted a telecommunications service, e-mail may have seemed like a crucial component of any Internet access service. E-mail was the original “killer app.” Today, we all know better. Most Americans get their e-mail from separate application service providers such as Google, Microsoft, and Yahoo, or from their employers or schools. While most Internet access providers do provide e-mail as well, it is clear that if they choose not to, the Internet Access Providers’ customers will simply go elsewhere for this service. E-mail is not an essential part of a commercial Internet access service. It is easily separable, and whether an Internet access provider chooses to offer an e-mail service should not be considered when determining whether the Internet access service is a telecommunications or information service.

A similar, but subtler, example is support for use of the Domain Name System (DNS). DNS is the global directory service that allows users to map human-readable names such as “www.fcc.gov” into IP addresses. These IP addresses can then be placed in the header of an IP packet, so that the IP Packet Transfer system can send the packet to its intended recipient. It is common for Internet access providers to place resolvers with caches in their network to facilitate this function for subscribers. Some people have made the mistake of viewing this as a core function of an Internet access provider, and an information service, when it is actually neither. The DNS look-ups provided by these resolvers make the Internet more useful, just as a phone book makes the telephone network more useful, but IP Packet Transfer works just as well without DNS look-ups. Internet users can usually get the IP addresses they need through means other than DNS look-ups, such as search engines, just as telephone users can often get the telephone numbers they need through means other than a phone book.

There are three reasons why an Internet access service does not become an information service simply because it includes access to DNS resolvers. First, it is separable. At the time of these FCC and Supreme Court decisions, it was probably difficult to imagine that an ISP could exist and not play a role in helping its subscribers make DNS queries. Now, we all know better. DNS support can easily be separated from IP Packet Transfer, and, today, some Internet users turn to Application Service Providers (such as Google) for this service, rather than to their Internet access provider. Thus, DNS should be viewed as an extraneous capability, like e-mail, not required for the core service.

Second, even when offered by the Internet Access Provider, this DNS capability is clearly only there in support of the core function of IP Packet Transfer, which is telecommunications. According to the Telecommunications Act of 1996, even a function that might otherwise be an information service will not be considered as such if it is merely used “for the management, control, or operation of a telecommunications system or the management of a telecommunications service,” which is the case here.

Third, for the purposes of categorization, there is little difference between DNS support offered by an Internet access Provider and the 411 directory service offered by many telephone service providers. Both allow a user to discover how to reach another party. Both are extraneous but useful conveniences offered to supplement a telecommunications service. No one argued that telephone companies were not providing a telecommunications service because they offered 411. Thus, DNS support should not be considered when determining whether commercial Internet access providers offer a telecommunications service or an information service.

Internet access providers also typically assign IP addresses to their customers, either on a static or dynamic basis. This process is important because it makes it unlikely that two end points will ever adopt the same address, a situation that would cause problems for both the network and the end users. Thus, it is another mechanism “for the management, control, or operation of a telecommunications system or .. service” in support of the IP Packet Delivery telecommunications service, and therefore not an information service. Moreover, the assignment of IP addresses is similar to the assignment of telephone numbers in the telephone network. Most telephone users get a new telephone number by requesting it from their telephone provider, and there is no debate over whether telephone networks offer telecommunications services. In some cases, users ask their new telephone provider to determine whether the user can regain rights to a phone number the user had once before with a previous provider, but this still requires coordination with the new phone company. Static IP addresses could be assigned in a similar manner, with Internet access providers assigning addresses when service begins. Users who want their IP addresses assigned on a dynamic basis typically learn about the assignment from a server operated by the Internet access provider using a protocol called Dynamic Host Configuration Protocol (DHCP). There is some difference in speed and convenience between this and obtaining an address over the telephone from an employee of the telephone company, but the use of a server is not consequential with respect to categorization. Indeed, other systems that offer telecommunications services also operate servers that provide important information dynamically in a similar manner. For example, a cell phone can request information from nearby towers about geographic location, or whether a phone call through those towers would incur roaming charges.

### **A Commercial Internet Access Service *Is Not* an Information Service**

Finally, Internet access does not fit the statutory definition of “information service” [TA96], which is quoted below.

“The term ‘information service’ means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.”

In IP Packet Transfer, packets are moved from sender to recipient without any change in format or content. This can be done without offering any of the things that the Telecommunication Act of 1996 says must be included in an information service. Merely transferring a packet to its intended recipient does not, by itself, involve generating, acquiring, transforming, processing, retrieving, utilizing, or

making available information. Of course, it is possible to make use of IP Packet Transfer to acquire information or to make information available, just as it is possible to make use of telephone calls to acquire information or make information available. For example, services have emerged whereby telephone users can call a given information provider to hear prerecorded messages with anything from sports scores to daily prayers. This does not change the fact that a commercial Internet access service and a commercial telephone service are both telecommunications services, according to the Telecommunications Act of 1996. IP Packet Transfer involves storage only in the sense that each packet can be queued at any router until it is the packet's turn to be transmitted by that router. However, this ephemeral storage of a packet, while in transit, is not a storage service. Indeed, users would much prefer that their packets spend as little time as possible in buffers waiting to be transmitted. It cannot reasonably be said that Internet access providers are providing the service of storing packets any more than the Department of Motor Vehicles (DMV) is providing the service of storing humans merely because there are sometimes many humans at the DMV waiting to be served.

There are some functions that are common if not required in a commercial Internet Access Provider that do involve "generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information" [TA96]. In addition to those already described in Section 2.2, commercial Internet access providers may want information systems for account management and billing, for configuration management, for the monitoring of failures and other state information, and to keep track of which addresses are reachable through each of the interconnected neighboring networks. All of these fall within the exception of "use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service" as explicitly defined in the 1996 Telecommunications Act [TA96]. They are also not very different from functions in the telephone system, and the existence of these functions did not make telephony an information service.

Many Internet Access Providers also provide true information services, as defined in the Telecommunications Act of 1996, merely to supplement their telecommunications service, but not as an integral part of that telecommunications service. Examples include e-mail and news sites, both of which are easily separable from Internet access. These companies may also lease customer premises equipment (CPE), or sell t-shirts. None of this matters when determining whether commercial Internet access services are telecommunications or information services.

## References

- [CP14] B. A. Cherry & J. M. Peha, *The Telecom Act of 1996 Requires the FCC to Classify Commercial Internet Access as a Telecom Service*, Comments in the Matter of *Protecting and Promoting the Open Internet*, FEDERAL COMMUNICATIONS COMMISSION GN DOCKET NO. 14-28 (Dec. 22, 2014).
- [FC15] FEDERAL COMMUNICATIONS COMMISSION, *Protecting and Promoting the Open Internet*, Report and Order on Remand, Declaratory Ruling, and Order, GN Docket No. 14-28 (March 12, 2015).
- [FC17] FEDERAL COMMUNICATIONS COMMISSION, *Restoring Internet Freedom*, FEDERAL COMMUNICATIONS COMMISSION WC Docket No. 17-108 (May 23, 2017).
- [PE06] J. M. Peha, *The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy*, TELECOM POLICY RESEARCH CONFERENCE (TPRC) (2006), and INTERNATIONAL JOURNAL OF COMMUNICATION (2007).
- [PE15] J. M. Peha, *The Network Neutrality Battles that will Follow Reclassification*, *I/S: A Journal of Law and Policy for the Information Society* (2016).
- [PE17] J. M. Peha, *Light-Touch Regulation by Banning Unreasonable Discrimination*, Comments in the Matter of *Restoring Internet Freedom*, FEDERAL COMMUNICATIONS COMMISSION WC Docket No. 17-108 (July 17, 2017).
- [TA96] Telecommunications Act of 1996, available at <https://transition.fcc.gov/Reports/tcom1996.pdf>